TRAINING MODULE

for

MEDICAL OFFICERS OF PRIMARY HEALTH CENTRES

Guidelines for Trainers

NATIONAL ANTI MALARIA PROGRAMME

(Enhanced Malaria Control Project)

Directorate General of Health Services

Ministry of Health and Family Welfare

22, Sham Nath Marg, Delhi-110054

Govt. of India

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Community Health Cell
Library and Documentation Unit
367, "Srinivasa Nilaya"
Jakkasandra 1st Main,
1st Block, Koramangala,
BANGALORE-560 034.
Phone : 5531518

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भारत सरकार
Government of India
राष्ट्रीय मलेरिया प्रतिरोध कार्यक्रम
National Anti Malaria Programme
(स्वास्थ्य सेवा महानिदेशालय)
(Directorate General of Health Services)
२२, शामनाथ मार्ग, दिल्ली–११००५४
22, Shamnath Marg, Delhi-110054

तार	:	मलेरिया, दिल्ली
Telegram	:	Malaria, Delhi
दूरभाष	:	2517780 PBX
Telephones	:	2517745 PBX
Director	:	2918576 (Dir.)
	:	6885610 (Res.)
Fax	:	2518329

सत्यमेव जयते

Dr. Shiv Lal
Director

PREFACE

The epidemiology of malaria has undergone considerable change during the past decade. Environmental degradation due to various man made activities from time to time has produced radical changes in our ecosystem. The malariogenic potential has been affected by the behaviour of vectors, parasites and human beings leading to local and focal nature of malaria dynamics. It is, therefore, now increasingly felt that capacity building at the local level viz. district and below is very important for the efficient and effective implementation of malaria control with the strategy as envisaged under the World Bank Assisted Enhanced Malaria Control Project.

Malaria control is presently a part of primary health care which calls for capacity building and training of medical officers, paramedicals and community influencers at the level of P.H.C. and below. It is in this context that a training programme for this band of health functionaries and corresponding beneficiary community members has been planned as a part of decentralisation of malaria control efforts.

National Malaria Eradication Programme has prepared two sets of training modules to be used for training of these functionaries and volunteers from community. The modules cover wide range of operational activities as laid down in the strategy for NMEP. Early Case Detection and Prompt Treatment (EDPT) Selective Vector Control (SVC) Area Specific Procedures for prevention, Disease transmission intervention; Prediction, Early Detection & Effective Response to malaria epidemics, Information Education Communication, (IEC) and training at the grass root level. It is hoped that the medical officers will take active interest in malaria control following the training course. The module can be used as a reference material for medical officers.

Delhi
March 1998

SHIV LAL

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GENERAL INTRODUCTION

Prior to implementation of malaria control measures (1953) and later malaria eradication programme (1958) in India, malaria was the major public health problem and affected all spheres of human life. In 1933 Sinton, one of the eminent Malariologists said "the problem of existence in very many parts of India is the problem of malaria".

In the past, a lot of research work was carried out on various aspects of malaria in India and the malariologists of this country were among the pioneers in this field.

The eradication strategy laid down was that the entire country would enter maintenance phase by 1966-67 and the responsibility of maintaining malaria free states would be taken over by the general health services.

Under the concept of Rural Health Care, the health infrastructure was developed around Primary Health Centres. The staff requirement and other logistic support have undergone many changes in the light of recommendations of Chadha Committee 1963 and Kartar Singh Committee, 1973.

The resurgence of malaria in the country in late sixties was due to various technical, administrative, organisational and logistic problems. It became apparent that malaria eradication was not a feasible proposition and the objective was changed to malaria control. The Primary Health Centre was made the nodal point for malaria case detection and treatment activities. For administrative and technical supervision at the district level, the District Malaria Officer was made in-charge of malaria control.

It is common knowledge that the distribution, intensity and prevalence of different parasite species in the community determine the malaria control strategy in the area. The case detection is the direct responsibility of PHC Medical Officer who is the focal point of such activities. As the efficiency of case detection determines the control strategy, the PHC Medical Officer has a onerous responsibility on his shoulders in the revised strategy of decentralised planning of malaria control. He has to plan and supervise the activities of MPW(M) and MPW(F), Health Supervisor (Male & Female) and FTC, DDC, MLV, etc. On his reports of monitoring and assessment of malaria situation in his area, the intervention measures are planned and executed. He is also responsible for treatment and management of serious cases of malaria with *P. falciparum* infection. His responsibility as a clinician lies primarily on early diagnosis and prompt treatment of such cases at the PHC level. In case proper facilities are not available, he should send the case to referral hospitals to prevent mortality due to malaria.

It is, therefore, necessary that PHC Medical Officer should be trained properly on various aspects of malaria control.

ORGANISATION OF TRAINING PROGRAMME ON MALARIA

The State health authorities or an identified training Centre will take the following steps for organising the training programmes. The guidelines given hereunder are only suggestive and the organisers of the training course could increase the extent and scope training wherever needed. The suggestions for further improvement of the trainers and learner's guides are most solicited which would be taken care of for incorporating in the revised edition of the Module.

(i) Resources :

The resources for the training should be earmarked and the funds must be made available for the training well in advance by the State Programme Officer. The State Health Authorities shall prepare the number of training courses to be conducted, fix venues and tentative dates, earmark the budget well in advance for smooth running of the training programme in the ensuing financial year.

Separate financial guidelines have been issued to conduct training courses with assistance from the "World Bank Assisted Malaria Control Project."

(ii) Venue of Training and Course Director :

The venue of each training course and the Course Director will be identified by NMEP or the State Programme Officer. While selecting venue of the training, the State Malariologist should keep in mind that the training institution must have all the infrastructure facilities listed at Sr. No. 1.4. The Regional Family Welfare Training Centre or any other reputed training centre with all the required facilities very near to the participants' working place as well as field practice centre will serve the purpose. The dates for training should be intimated to the training institution to reserve the slot for the five days training course.

The Course Director should be a senior health official such as Regional Director/Zonal Officer/Principal of R F W T C/Deputy Director (M)/Chief Medical & Health Officer. The Course Director should possess expertise in malariology and preferably should have undergone training in Malariology or Malaria Entomology conducted by the Directorate of NMEP/NICD/MRC/IVCZ (Hosur-TN) or any other reputed organisation. Officers having experience in training of communicable diseases control can also be identified as trainer or Course Director.

(iii) Training Period :

The training would be for five days preferably from Monday to Friday without any intervening public holidays. The training during peak malaria transmission period should be avoided so that the Medical Officer's presence is ensured in the PHC to supervise the control measures and man the referral centre for the management of severe and complicated malaria.

(iv) Number of Participants :

Each training course should have about 25 participants. The participants should be informed at least one month before the commencement of training. The participants have to confirm in writing to the Course Director about the time, date and mode of travel as well as requirement of accommodation to the concerned Officials.

(v) Course Co-ordinators :

The Course Director should identify senior officers for sharing the responsibility of different aspects of training such as accommodation, audio-visual Aids, other class room facilities and field visits etc. There shall be one or two Course Co-ordinators who will be assisting the Course Director in the overall coordination of different disciplines and activities.

(vi) Transport :

A 40 seater bus shall be hired so that all the participants, faculty and resource persons can travel together for the field exercise which would save time and facilitate interaction between participants and faculty instead of transporting them in piecemeal.

1.2. Calendar of Activities

The Course Director in consultation with the Course Co-ordinators and other officers involved in the training shall prepare calendar of activities, at least three months ahead of the training. A check list for each aspect should be prepared.

First Four Weeks (i.e. 12th to 9th week before the commencement of training):

The State Health Directorate shall be informed of the confirmed dates of training and issue circular to all the DMHOs of the Region to sponsor specified number of Medical Officers of the highly problematic PHCs on priority and to intimate the names of participants to Directorate of Health Services with a copy endorsed to the Course Director. The Director of Health Services should allocate the funds with instructions on how to spend the money under each head. In case the training course is conducted through WHO assistance, the general circular for incurring the expenditure under different heads must be communicated to the Course Director. However, for World Bank assisted training programmes, there are separate guidelines. The participants shall confirm in writing about their participation in the said training to ensure full attendance.

Fifth to Eighth Week (i.e. 8th to 5th week before the commencement of training) :

(i) The letter for accommodation shall be addressed to the concerned Departments by the Course Director.

(ii) A 40 seater bus should be arranged for transportation of Participants.

(iii) Catering arrangement for tea & working lunch should be made in advance.

(iv) The faculty for delivering lectures and field exercises should be identified and their confirmation letters received well in advance. The faculty should be provided with literature concerning the topic and should also be informed about the availability of facilities like overhead and slide projectors, flip charts, writing board, etc.

(v) The Officer-in-charge of the field visit should visit the PHC to make advance arrangements for the field exercises.

Ninth to Tenth Week (i.e. 4th to 3rd week before the commencement of training):

(i) The Chief Guest and other speakers should be identified and informed of the inaugural programme.

(ii) Preserved material for conducting the inaugural exhibition to be procured and kept with the officer-in-charge.

(iii) Invitation cards, if desired, for the inaugural session to be got printed.

(iv) Certificates, if any to be distributed should also be got printed.

Eleventh Week (i.e. 15 to 8 days before the commencement of training):

(i) The banner for the training course should be made ready.

(ii) Stationery items to be procured.

(iii) Photostat copies of the lecture notes to be completed.

(iv) Sets for distribution to the participants to be made ready.

(v) Invitation cards, if got printed should be posted.

Final Week: (i.e. 7th day to the day of commencement of training) :

(i) The Course Director will re-confirm all the preparations for the different activities and ensure smooth inauguration of the training on the following Monday.

(ii) It should be ensured that the audio-visual equipment is in good working order. He should ensure that the concerned officers and staff meet on Saturday and Sunday preceding the actual training for completion of all preparations.

(iii) On Sunday the live specimens for Exhibition to be collected and the material be kept ready for display on Monday morning.

1.3. Selection of Faculty

As already indicated the identified faculty for the particular topic shall be informed well in advance to allow sufficient time for preparation of lecture notes, transparencies and slides.

The faculty for the topic shall be proficient in the art of pedagogy who should allot sufficient time for interaction with the participants. It is preferable to select a Chairman for morning and afternoon sessions for moderating the topic and time keeping.

The faculty could be selected from the State Health Directorate, ROH & FW, RFWTC, Medical Colleges, Dte. of NMEP, Zonal Office, DMHOs, NICD Branches etc.

1.4 Requirement of Training Facilities in the Training Institute

The following material is the minimum requirement for the training component.

1.4.1 Audio-visual equipments like (a) slide projector (b) over head projector (c) microphone system (d) television (e) VCP (f) cassettes on bio-environmental methods, impregnated bednets and others which are relevant (g) white writing board/coloured pen set for the board (h) duster (i) spare blank transparencies and pen set for transparencies and (j) photography for inaugural/concluding sessions.

1.4.2 A good lecture hall having the facility like chairs, seminar tables, good ventilation and least sound disturbance.

1.4.3 Facilities for typing and photostat arrangements.

1.4.4 Demonstration material for pictoral exhibition of different malariogenic situations in the State, live demonstration of vectors and aquatic stages, microscopic demonstration of parasites, different methods of personal prophylaxis, bio-environmental and chemical control methods, spray equipments, charts, maps depicting malaria related aspects, etc.

1.4.5 Lecture notes, review papers and other teaching material, writing material, file covers, etc.

1.4.6 Facilities for serving snacks, tea and lunch.

1.4.7 Adequate transportation & accommodation facilities.

1.5 Principles of Training

The following major principles are to be followed while conducting the training :—

(i) The training period should be judiciously balanced between class room lecture-discussion, practical demonstration in Laboratory/field and work performance in the field pertaining to the programme needs in the existing field conditions.

(ii) The learning objectives and the skills to be developed as given in Training Module should be kept at the back of mind while conducting the training.

(iii) The lecture component should always allocate sufficient time for discussion and the moderator should ensure full participation of the learners so as to increase the learning urge and full attention to the topic.

(iv) The training programme should be competency based with emphasis on imparting skills according to job responsibilities.

(v) Current drug (chloroquine) resistance status (as of 1997) in the State given in separate table.

(vi) While teaching malaria vectors (Unit 3) emphasis should be on the bionomics of the local vectors.

1.6 Material to be distributed to the participants at the time of registration

The following material should be distributed to the participants at the time of registration.

(i) File cover/folder for keeping day learning material.

(ii) Writing material, note pad (bigger size), ball point pen, lead pencil, eraser and pencil sharpener.

(iii) Malariology Training Modules for PHC Medical Officers.

(iv) Training Module for Peripheral Health Workers and Community.

(v) Laminated folder on Malaria Parasite.

(vi) Operational manual on Malaria Action Programme.

1.7. Arrangements for Inaugural Session

The following arrangements shall be made for the inaugural session:

(i) Seating arrangements on the dais with name plates.

(ii) Banner on training programme to be hanged at the back side of dais.

(iii) Seating arrangements for participants and special invitees.

(iv) Working condition of audio-visual equipment to be checked before the actual function.

(v) Standby generator to be kept ready for meeting the exigency of power failure.

(vi) Copies of key note address, if desired.

(vii) Bouquets for the Chief Guest and VIPs, if desired.

(viii) Photography arrangements, if desired.

(ix) Inaugural Tea & Snacks.

1.8 Material for Exhibition during Inaugural Session

The following display material to be exhibited outside the lecture hall but in the vicinity of place for inaugural tea:

(i) Microscopic demonstration with labelling of different stages of various species of malaria parasite like ring, trophozoite, schizont of *Pv* and ring, gametocytes of *Pf* etc.

This will be done daily for the first three days with 5 compound microscopes.

(ii) Aquatic stages of live specimens of *Anopheles*, *Culex* and *Aedes* in petri dishes and adult male & female specimens of these *genera* in test tubes.

(iii) Display of pinned malaria vectors in the region focussed under simple microscope.

(iv) Spray equipment and other control measures—bio-environmental and chemical.

(v) Personal prophylactic measures—models on the use of impregnated bednets-mosquito proofing of house, etc.

(vi) Charts on life cycle of malaria parasite, life history of *Anopheles* and *Culex*.

(vii) Posters on environmental sanitation and other IEC material.

(viii) Tables and Graphs depicting epidemiological data and malaria incidence in different years and monthly trend in the Region and State and highlighting problem districts and PHCs. Charts, maps and photographs depicting epidemiology and control aspects of malaria. Pictorial exhibition of different malariogenic situations in the State. Table on DDCs and FTDs established and functioning.

(ix) Any other material supplied by NMEP.

1.9. Pre-test/Post-test

Pre-test model paper is given separately in the form of question bank. The training coordinator may choose appropriate questions. The tutor may not repeat the same questions for every training batch. The pre-test papers should be evaluated immediately by the Faculty within half an hour when the participants are engaged in lecture discussion. The participants should be informed about the errors committed by them in the pre-test. Post-test questions may be same as in pre-test.

1.10. Field Visit—Briefing and Other Details

The participants shall be informed about the exact time to assemble for field trip and the exercises to be conducted there. The participants are divided into five groups, having a leader for each group. The tasks to be conducted are explained in detail with the proformae for each task and the area (village or part of a village) earmarked to each group. Resource person for each group should be identified who should accompany and guide the group in the field exercises.

The Training Officer in charge of field visit will drop each group at a specific point and give them instructions to assemble at a particular place for return trip. The resource person will take the group around the village as per predetermined route so that the time is spent judiciously to extract maximum work.

Each participant of the group shall be exposed in turns to blood smear collection, filling up of the proforma, interview with the community leaders, householders, private practitioner, Malaria Link Volunteer (MLV) etc. Similar method will be followed for IEC which shall be conducted side by side with active and passive case detection components. Each participant may conduct Knowledge Belief Aptitude and Practice (KABP) study on the prescribed proforma in at least from three randomly selected households. The participants should interact with the students and teachers of the school on IEC.

The afternoon session may be conducted at PHC headquarters. All the participants may be divided into two batches; one batch for demonstration of indoor residual spray while the second batch for Laboratory demonstration & evaluation of anti-malaria activities. During visit to the Laboratory, the participants may be shown the maintenance of records, proformae, charts and maps. They may also be shown stain preparations, staining and examination of blood smears. After completing the first assignment, the batches will attend to the second assignment.

The participants will supervise the preparation of suspension, measure the discharge rate of nozzle tip, learn the spray techniques and calculate dose of active ingredient per sq.m.

1.11. Epidemiological and Skill Learning Exercises

The exercises are given in the module. These are to be distributed to the participants in the class room and they have to individually solve the exercises within 60 minutes. The exercises, preferably be given to the participants on the third day of the training as a home work.

The tutor shall take the exercise one after the other systematically on the final day. Doubts of participants will be cleared by the tutor. The solved epidemiological exercise will be kept with the participants for future reference.

1.12. Evaluation of Training by the Participants

The proforma for evaluation of training is given separately which may be modified if needed. The critical comments could be anonymous and the faculty shall take these comments into consideration for improving the training programme wherever needed, for subsquent batches.

1.13. Concluding Session

At the concluding session all the participants. faculty and resource persons will have group discussion and summing up of field exercises.

The Chief Guest for the occasion to be contacted on the preceding day to ensure his presence in time, so that the participants are not unduly detained for the occasion, since some of the participants may have already made arrangements for return journey to their working places.

Note : Disbursement of per-diem and T.A. expenses should be made during lunch break or at the time of epidemiological exercises on the last day.

UNITWISE OBJECTIVES AND GUIDELINES TO THE TRAINER

UNIT - 1

INTRODUCTION TO MALARIA PROBLEM IN INDIA

Objectives

(i) Various factors influencing the disease pattern in the community
(ii) Nature of malaria infection
(iii) Distribution of malaria and its important epidemiological characteristics
(iv) Problem of malaria in India
(v) Constraints

Instructions to Tutor

Discuss environmental factors, role of climate, pattern of distribution of malaria in the world, important characteristics of malaria transmission, focal and seasonal problems of malaria in India during forties, prevalence of holo, hyper, meso and hypo endemic areas in India, socio-economic aspects, history of control measures, population break-up and results achieved. Describe strategy of eradication and achievements during this period. Reasons for switching over to Modified Plan of Operation, Strategies under Modified Plan of Operation and present strategy of Malaria Action Programme (MAP) (1995) as well as enhanced malaria control project with World Bank assistance.

Teaching Aids

Transparencies on

1. Malaria estimates in the pre-control era.
2. Pilot control measures.
3. Launching of NMCP in 1953 with objectives and achievements.
4. Launching of NMEP in 1958 with objectives and achievements.
5. Launching of MPO in 1977 with objectives and achievements.
6. Malaria incidence at different points of time 1958-59, 1965, 1976-77, 1980, 1984, 1989-1997 or the latest.
7. MAP—Revised Strategy objectives
8. Endemicity malaria maps of India (a) pre-independent India (b) 1997 or the latest.

UNIT - 2

LIFE CYCLE, TRANSMISSION AND MORPHOLOGY OF HUMAN MALARIA PARASITE

Objectives

(i) To recall the various stages in the life cycle of malaria parasite in (a) human host, (b) mosquito vector.

(ii) To know why there are no relapse in infections with *P. Faliciparum* and *P. Malariae*

(iii) To define the pre-patent period, incubation period and incubation interval of malaria infection with different species of malaria parasite.

(iv) To identify different stages of various species of malaria parasite under the microscope.

Instructions to Tutor

Describe the species of human parasites and the life cycle of malaria parasite in man and mosquito. Discuss in detail the tissue phase in liver parenchyma cells, presence of hypnozoites in *P. vivax* and *P. ovale* and the number of merozoites from cryptoschizont. Describe erythrocytic phase, duration of schizogony in different species, the number of merozoites, formation of hemozoin pigment, stippling in the host cell, schizogony in *P. falciparum*, band forms in *P. malariae* and gametogony with morphological description in different species & sex. Give details of sexual cycle, the reasons for calling the female Anopheles mosquito as definitive host, formation of gametes, zygote, ookinete, oocyst, the release of sporozoites. Describe microscopic differentiation of different species of malaria parasite and recapitulation of life cycle through diagramatic presentation.

Teaching aids:

Life cycle charts of different species. Microscopic demonstration of malaria parasites (different species and stages) to be shown during exhibition.

Transparencies on:

1. Pictorial life cycle of malaria parasite.
2. Exoerythrocytic tissue phase.
3. Erythrocytic schizogony.
4. Microscopic differentiation of malaria parasite species.
5. Gametogony.
6. Sporogony cycle.
7. Diagramatic presentation of life cycle in man.
8. Diagramatic presentation of life cycle in mosquito.

UNIT - 3

MALARIA VECTORS—MOSQUITOES AND THEIR BIONOMICS

Objectives

(i)	To define the vectors
(ii)	To name different mosquito species of medical importance
(iii)	To know differences, important habits, distribution and sphere of influence of malaria vector
(iv)	To understand common breeding sites of mosquito vector
(v)	To know about the transmission of malaria
(vi)	To learn about life cycle of mosquitoes

Instructions to Tutor

Enumerate vectors of malaria, filariasis, dengue, JE and other viral infections. Describe place of mosquito in Class Insecta. Describe the body parts of the mosquito. To emphasise that only Anopheles transmits malaria. Out of many species, only 9 vectors transmit malaria in India.

Name of the vectors

Describe different characteristics of Anopheles, Aedes and Culex. Discuss all four stages of mosquito. Discuss general bionomics of Indian mosquito vectors including their distribution, sphere of influence endemicity, transmission, sporozoite rate, larval habitats, resting places, biting time, feeding habits, flight range and insecticide resistance.

Discuss in detail the vectors in the region. Mention the broad outlines of those which are not local.

Teaching Aids

1. Pictorial map—rural and urban.
2. Video cassettes.
3. Slides of mosquitoes—morphology indicating body parts.
4. Vector morphology chart.

5. **Vector life cycle chart**

Transparencies on

1. Bionomics of *An. culicifacies*
2. ,, ,, *An. fluviatilis*
3. ,, ,, *An. philippinensis*
4. ,, ,, *An. stephensi*
5. ,, ,, *An. sundaicus*
6. ,, ,, *An. minimus*
7. ,, ,, *An. annularis*
8. ,, ,, *An. dirus*
9. ,, ,, *An. varuna*

UNIT - 4

ROLE AND RESPONSIBILITIES OF MEDICAL OFFICER-- PRIMARY HEALTH CENTRE UNDER NMEP

Objectives

(i) To Define and discuss roles and responsibilities of Medical Officers of PHC's working under NMEP.

(ii) To interact with the Medical Officers about the constraints in discharging job responsibilities in the implementation of NMEP activities.

(iii) To suggest remedial measures in overcoming the difficulties in the discharge of responsibilities efficiently.

Instructions to Tutor

Panel Discussion

The discussion should be held with Medical Officers and three or four panel members from the District/Zonal/Regional/State/National experts. Each responsibility should be discussed thoroughly and remedial measures suggested if any.

Transparencies on

1. Job responsibilities in Early Case Detection
2. Job responsibilities in prompt treatment
3. Job responsibilities on insecticidal spray
4. Job responsibilities on referral services
5. Job responsibilities on miscellaneous activities like training of peripheral workers etc. pertaining to malaria.

UNIT - 5

MALARIA: CLINICAL PROFILE & DIFFERENTIAL DIAGNOSIS

Objectives :

(i) To diagnose a case of malaria clinically based on the signs and symptoms.
(ii) To suspect severe malaria and its complications.
(iii) To understand the necessity of early diagnosis and prompt treatment of malaria especially in infants, children and pregnant women.
(iv) To differentiate coma in cerebral malaria from other causes of coma.
(v) To request various investigations and interpret the results with reference to malaria and its complications.

Instructions to Tutor

Describe clinical presentation of classical malaria and other signs and symptoms. Discuss salient features of different species of Malaria suspected malaria fever cases and complications of *P. falciparum* malaria. Give details of differential diagnosis of cerebral malaria and its associated complications. Describe clinical picture of Black Water Fever. The variations in signs & symptoms among adults and children, and also highlight. The common errors while making diagnosis.

For further details please refer to the module on clinical management of malaria.

Teaching Aids

Microscopic demonstration of different species and stages to be repeated on the second day of training.

Transparencies on :

1. Clinical presentation of classical malaria
2. Other signs and symptoms
3. Salient features of malaria—Different species
4. Suspected malaria fever cases
5. Salient features of *P. falciparum* malaria
6. Signs and symptoms of *P. falciparum* malaria
7. Complications of *P. falciparum* malaria
8. Differential diagnosis of cerebral malaria
9. Complications of cerebral malaria
10. Black Water Fever
11. Signs & symptoms in adults and children
12. Errors in diagnosis

UNIT - 6

SUPERVISION OF LABORATORY SERVICES

Objectives:

(i) To realise the importance of accurate and prompt microscopic confirmation of malaria diagnosis.

(ii) To judge the efficiency of laboratory technician.

(iii) To recognise the quality of staining of blood smear.

(iv) To assess the accuracy of microscopic diagnosis.

(v) To inspect the laboratory records and find out the accuracy of its maintenance.

(vi) To assess the epidemiological situation in the area.

(vii) To assess how passive agencies, FTDs, DDCs. MLVs and others are functioning.

(viii) To assess the efficacy of active case detection.

Instructions to Tutor

The importance of early microscopic examination of blood smears and prompt treatment of all malaria cases (EDPT) should be emphasised. Discuss essential aspects of microscopy and the need for random checking of blood smears. The time lag between the blood smear collection, staining, examination of blood smears, despatch of results to the periphery and the administration of radical treatment should be inspected by the medical officers from the records and the tutor should highlight the importance of EDPT for accelerating the Malaria Action Programme (MAP). Give salient points in cross-checking the field activities from the relevant records and how the records and charts are to be maintained up to date.

Transparencies on :

1. Importance of microscopy vis-a-vis chemotherapy
2. Essential aspects of microscopy
3. Checking random samples of blood smears
4. Inspection of records—time lag
5. Cross-checking of field activities from records
6. Maintenance of records and charts at PHC.

UNIT - 7

ANTIMALARIAL COMPOUNDS, THEIR USE IN NMEP

Objectives :

(i) Chronological development of antimalarial compounds.
(ii) Their action on pre-erythrocytic asexual and sexual stages of parasite.
(iii) Their mode of action
(iv) Their toxicity on human beings.
(v) NMEP Antimalarial Drug Policy—1995
(vi) Drug resistance and its distribution in India.

Instructions to Tutor

Describe the use of antimalarials as per classification as well as curative and preventive aspects. Discuss the action of antimalarials and the factors influencing the efficacy. Give details of chemical groups. Describe agewise dosage schedules for presumptive and radical treatment in high and low risk areas and chloroquine resistant *P. falciparum* areas. Discuss in detail the salient features of important antimalarials including long acting sulpha group, Artemisin, Mafloquine, Halofantrine etc. Give details about chloroquine resistant foci in India and the *Pf* Monitoring for liquidation of resistant foci. Describe and discuss Antimalarial Drug Policy—1995.

Transparencies on :

1. Objectives
2. Use of antimalarials for prophylaxis of malaria
3. Use of antimalarials for treatment of malaria : (curative & preventive)
4. Action of antimalarials
5. Factors influencing efficacy
6. Chemical groups
7. Presumptive treatment in low risk areas
8. Presumptive treatment in high risk areas
9. Presumptive treatment in *Pf* resistant areas
10. Radical treatment for *P. vivax* and *P. malariae*
11. Radical treatment in *Pf* resistant area
12. Agewise dosage of sulpha pyremethamine combination
13. Use of new antimalarials
14. Use of Mefloquine
15. Chloroquine resistant foci in India
16. Chloroquine resistant map of India

UNIT - 8

DEVELOPMENT OF REFERRAL SYSTEM FOR MALARIA UNDER THE PRIMARY HEALTH CARE DELIVERY SYSTEM

Objectives:

(i) Need to develop a referral system for malaria cases.

(ii) Functions of different echelons of PHC personnel in the treatment of malaria cases.

(iii) Importance of developing liaison with CHC, Sub-Divisional and District Hospitals.

(iv) Drugs and equipments required for treatment of serious patients of Malaria.

Instructions to Tutor

Discuss details about the important aspects in the diagnosis of malaria and essential requirements needed in the referral centres. Discuss the role of peripheral workers MLV's/DDC's/ FTD's in the identification of cases, signs and symptoms of malaria, serious complications and criteria for referral to PHC. List out the essential facilities to be provided for referral to PHC. Describe the criteria for referral to district hospital and the relevant records and case sheet to be sent along with the referred patient. Give referral links between PHC and CHC/District Hospital/Taluk Hospital.

Transparencies on:

1. Important aspects in diagnosis of malaria
2. Essential requirements in referral centre
3. Role of peripheral workers in the referral system
4. Criteria for referral to PHC
5. Essential facilities for referral in PHC
6. Criteria for referral to District and Records to be sent
7. Records to be sent along with the referred patient
8. Referral links between PHC and CHC/District Hospital/Taluk Hospital.

UNIT - 9

MALARIA—CASE MANAGEMENT & SPECIFIC TREATMENT

Objectives

(i) Specific treatment of malaria.

(ii) Treatment and management of complicated malaria cases.

(iii) Treatment of malaria in
  (a) Infants and children
  (b) Pregnancy

(iv) Requirement for case management under specific situations encountered in complicated cases of malaria.

Instruction to Tutor

Describe the management of uncomplicated malaria caused by *P. vivax*, *P. malariae* and *P. falciparum* and then complicated *P. falciparum* malaria. Describe management of signs and symptoms such as hyperpyrexia, dehydration, acute renal failure, oliguria, bleeding, jaundice and liver damage, shock, anaemia, hypoglycaemia, etc. Discuss nursing care and laboratory follow-up. Give details of management in pregnant women, treatment of infants and children. Chemoprophylaxis, its indication and recommended dosage schedule.

Transparencies on

1. Management of uncomplicated malaria
2. Management of complicated *P. falciparum* malaria
3. Management of Hyperpyrexia and dehydration
4. Management of Acute Renal failure and oliguria
5. Management of Hyperkalaemia, hypokalaemia and pulmonary oedema
6. Management of Gastrointestinal bleeding, jaundice and liver damage.
7. Management of shock, anaemia, PCV less than 20%, Hb less than 7 gm and hypoglycaemia
8. Nursing care
9. Laboratory follow-up
10. Management in pregnant women
11. Treatment of infants & children
12. Resume of common complications for management
13. Do's and Don'ts
14. Chemoprophylaxis

UNIT - 10

INVESTIGATION OF DEATH DUE TO MALARIA

Objectives

(i)	Investigations of deaths due to malaria
(ii)	Epidemiological significance of malaria deaths
(iii)	How to avoid wrong classification of deaths which are likely to inflate the figures

Instructions to Tutor

Discuss in detail the epidemiological investigation on death due to malaria and the limitation of time between death and investigation. The tutor should emphasise that *P. falciparum* only is the direct cause of malaria deaths. Concomitant malaria infections in many seriously ill patients should be looked into before concluding the cause of death. The investigation should record the relevant information such as the place where symptoms were first noticed, medical history, statements from relatives, medical and paramedical personnel, details of drugs administered, route of drug administration, chronological order of events. Post-mortem report if available, time lag in the diagnosis and treatment, etc. The sub-items of the proforma should be discussed thoroughly.

Transparencies on

1. Epidemiological investigation: place of first sign and symptoms, place of death, time lag of investigation.
2. Mortality due to *P. falciparum:* pathological changes leading to death, concomitant infection, etc.
3. Investigation on death due to malaria : Case history, antimalarials and other drugs administered and the route of administration.
4. Investigation (continued): Details of sub-items in the proforma, particulars of physicians attending the case, time lag in the diagnosis and treatment, remedial measures in the localities etc.

UNIT - 11

STRENGTHENING OF SURVEILLANCE MECHANISM : MONITORING, ASSESSMENT AND EVALUATION

Objectives

(i) To differentiate between monitoring, assessment and evaluation of a programme.

(ii) To identify various components of programme activities to be monitored.

(iii) To remember when and at what period of the year, each activity is given priority for monitoring.

(iv) To draw logical conclusions during the process of monitoring and formulate the remedial actions to improve programme implementation.

Instructions to Tutor

Define the terms Monitoring, Assessments and Evaluation with explanatory note to distinguish the terms. Give the salient aspects and follow-up action consequent to Monitoring by MO-PHC. Discuss different parameters used in the Monitoring. Describe the frequency of assessment along with parameters. Explain important points pertaining to Evaluation.

Transparencies on :

1. Definition of Monitoring, Assessment and Evaluation
2. Important points pertaining to monitoring by MO-PHC
3. Salient aspects of Monitoring and follow-up action consequent on monitoring.
4. Parameters in monitoring
5. Salient points pertaining to evaluation

UNIT - 12

PLANNING OF INTERVENTION MEASURES FOR TRANSMISSION CONTROL

Objectives:

(i) Discussion regarding preliminary information essential for planning of intervention measures.
(ii) How to analyse the preliminary information and utilise the same while planning intervention measures.
(iii) Various transmission control/intervention measures.
(iv) How to plan residual insecticidal spraying.
(v) How to supervise the spray operations.

Instructions to Tutor

Discuss the relevant information required for planning control measures and investigations done during Transmission season.

Describe various transmission control measures and personal protection methods. Give exercises for selection of population for residual insecticidal spray with due priority to high risk areas as recommended by the Expert Committee on Malaria (1995). Discuss salient aspects pertaining to vector resistance vis-a-vis change of insecticide. Describe procurement of insecticide and its distribution and explain how to calculate manpower requirement for spray operations. Discuss the details of advance spray programme, its execution and supervision.

Teaching Aids

Keep the microscopic demonstration of different stages of malaria parasites on third day also.

Transparencies on

1. Information needed for planning control measures.
2. Investigation to be carried out regarding transmission period.
3. Transmission control measures.
4. Selection of population for residual insecticidal spray.
5. Insecticidal requirement.
6. Vector resistance to insecticide and change of insecticide.
7. Procurement & distribution of insecticide and manpower required for spray.
8. Advance spray programme, spray execution and supervision.

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Selective Vector Control (S.V.C.) measures with feasible bio-environmental control methods in high risk areas and use of impregnated bednets.

II. Objectives :

(i) acquaint with different bio-environmental control methods.

(ii) implement bio-environmental control methods wherever feasible through inter-sectoral co-ordination.

(iii) learn the technique of impregnating the bednet and highlight the benefits of impregnated bednets as a personal protection measure amongst the community members.

Instructions to Tutor

Give introduction to the subject before playing the video cassettes. Allow 15 minutes discussion after playing video cassettes. The suitable bio-environmental control measure in different malaria paradigms shall be discussed.

Teaching Aids

1. Video cassettes on Bio-environmental control methods.
2. Video cassette on the use of impregnated bednets.
3. Demonstration showing impregnation technique of bednets.

UNIT - 13

INFORMATION, EDUCATION AND COMMUNICATION (IEC) ON MALARIA CONTROL

Objectives :

(i) To understand the importance of IEC for community co-operation and participation in the successful implementation of Malaria Action Programme.

(ii) To create awareness and change the attitudes and practices amongst the members of the community about the cause, prevention, early treatment and management of malaria leading to the reduction in the mortality and morbidity.

(iii) To create awareness and healthy practices about the drastic reduction in the frequency of contact between man and mosquito by using personal prophylactic measures especially use of impregnated bednets.

(iv) To create awarenenss and change the attitudes, practices and demand among masses regarding various methods which will bring about reduction in the parasite load in the community through early case detection and prompt treatment.

(v) To create awareness and healthy practice on the methods which can bring about reduction in the mosquitogenic conditions through bio-environmental and chemical control methods.

(vi) To create awareness about the importance and demand of achieving over 80 per cent coverage of targeted rooms during every round of indoor residual insecticidal spray operations.

Instruction to Tutor

Describe the purpose, General objective and specific objectives of IEC. (The operational Manual on Malaria Action Programme may also be referred by the tutor on relevant aspects of IEC). Discuss the strategy and Media mix for effective implementation of IEC. The tutor may identify the responsibility at Central, State and peripheral levels. The guidelines for observance of Malaria month at various levels with main activities especially at peripheral levels shall be discussed. Responsibility of MO-PHC in the implementation of IEC should be emphasised in the lecture-discussion. Salient points to be covered in IEC shall be listed by the tutor.

Transparencies on:

1. Purpose and objectives of IEC
2. Strategy and Media Mix
3. Responsibilities of IEC at various levels
4. Observation of Malaria month Guidelines
5. Responsibility of MO-PHC
6. Salient points to be covered in IEC.

UNIT - 14

EPIDEMIOLOGY OF MALARIA

Objectives:

(i) Distribution of malaria in terms of time, place and person.

(ii) Factors governing the endemicity of malaria.

iii) Effects of environment on transmission of malaria.

(iv) Influence of different factors on transmission, Planning and evaluation of Malaria control.

Instruction to Tutor

Classify the areas on the basis of spleen rate in children. Discuss in detail various epidemiological factors related to parasite species, gametocytes, incubation interval, seasonal variation in respect of *P. vivax* and *P. faciparum*, environment, vectors, human host, genetic variation in the endemic population and human immune mechanism.

Transparencies on:

1. Endemicity classification as per WHO
2. Factors relating to parasite species
3. Factors relating to gametocytes
4. Incubation interval and seasonal variations
5. Environmental factors
6. Vectoral factors
7. Host factors
8. Genetic factor
9. Human immune mechanism.

UNIT - 15

PREDICTION, EARLY DETECTION AND EFFECTIVE RESPONSE TO MALARIA OUTBREAK

Guidelines for prediction, early detection and effective response to Malaria outbreaks have been circulated by NMEP. These guidelines are reproduced in the learner guide. The guidelines may be discussed giving live examples in the district with special reference to the role of PHC. NMEP has also made operational manual for prediction, detection, prevention and control of malaria epidemics. This manual has an element of flexibility so that the trainer can teach the participants according to the area specific needs.

UNIT - 16

SELECTION OF HIGH RISK MALARIOUS AREAS ON THE BASIS OF CRITERIA DEVELOPED BY THE EXPERT COMMITTEE ON MALARIA, 1995

Objectives :

(i) Compile data for identification of worst affected '*high risk*' malarious areas in the PHC.

(ii) List out the villages or groups of villages or subcentres based on the criteria recommended by the Expert Committee on Malaria (1995) by adopting prescribed methodology.

(iii) Highlight the villages/subcentres requiring indoor residual spray on the basis of MAP guidelines

Instructions to Tutor

The tutor may also refer to the Operational Manual on Malaria Action Programme-(MAP), 1995, besides consulting the detailed note, pertaining to the UNIT. Only 'High Risk Rural' areas are to be identified as per the criteria laid down by the Expert Committee on Malaria - 1995. The tutor should give at least one exercise for each criteria so that the participants are in a position to identify the criteria under which the village/subcentre can be classified as high risk areas. The examples given in the module for learner should be discussed in detail to make the participants familiar with the criteria.

Transparencies on

1. Identification of high risk areas as per criteria recommended by the Expert Committee on malaria - 1995.
2. Methodology for selection of high risk areas.
3. Table to be completed at PHC for selection of high risk villages/subcentres.

UNIT - 17

MANAGEMENT INFORMATION SYSTEM IN MALARIA CONTROL

Objectives :

(i) Importance of each form used in NMEP especially those to be maintained by the peripheral health workers, PHC Laboratory maintenance of registers, charts, graphs, tables, etc.

(ii) Timely submission of complete, accurate and relevant data to the concerned in the prescribed forms.

(iii) Collection and interpretation of information to take corrective measures immediately.

Instruction to Tutor

Describe the purpose and flow of information pertaining to Malaria Action Programme. Enumerate the charts and registers to be maintained at PHC. (The tutor may consult the Operational Manual for Malaria Action Programme 1995 for different charts and registers to be kept at PHC). The collection of data at subcentre level and the utilisation of information for monitoring the programme at different levels should be covered in the lecture-discussion. Discuss different MF forms including the new forms giving more emphasis to the forms to be maintained at PHC. Give brief account of use of MIS at the Dte. of NMEP.

Transparencies on

1. Purpose and flow of information under MIS
2. Charts and Registers to be maintained at PHC
3. Data Collection at subcentre and utilisation at different levels
4. MIS in NMEP
5. Use of MIS at the Directorate of NMEP

UNIT - 18

TRAINING OF PERIPHERAL STAFF AND COMMUNITY BY MEDICAL OFFICER OF PHC

Objectives

(i) Importance of training the peripheral staff under his administrative control and from community.

(ii) Methods of conducting training course based on the job requirements of each category.

(iii) Preparation/utilisation of proper training aids for each course curriculum.

Instructions to Tutor

The tutor may refer to Annex-9 of Operation Manual for MAP (1995) on training needs of peripheral workers. Give norms of establishment of FTD, DDC, MLV, MPW and Microscopist as per size of population. The methods of training to be conducted for each category of worker based on the job responsibilities should be highlighted and relevant aspects covered while imparting training for efficient discharge of role of worker in the Malaria Action Programme. All the prerequisites needed for the training centre should be discussed thoroughly and the methods of drawing calendar of activities for training should be covered. (The training curriculum and module for each cadre of peripheral worker should be supplied to MO-PHC before the actual commencement of training for grassroots level workers).

Transparencies on

1. Norms for establishment of FTD's, DDC's, MLVs, and microscopist as per the size of population.
2. Category of peripheral workers to be trained.
3. Salient points for designing training curriculum.
4. Essential components of training.

A separate module for the training of MPW/MLV/DDC/FTD has been prepared by NMEP the same may be introduced to the participants.

PLANNING AND ORGANISATION OF RESIDUAL INSECTICIDAL SPRAY OPERATIONS

1. AREAS TO BE SPRAYED AND CHOICE OF INSECTICIDE

Spray operations are conducted through the organisation of Government efforts, seeking full public co-operation with the spray squads to achieve better insecticidal coverage.

Indoor residual spray with the proper insecticide during the transmission is the method in the rural areas while in the urban areas antilarval operations constitute the main method for interrupting the transmission.

Having selected the areas for regular spray operations as per guidelines in MAP, it should be decided which area(s) should go under spray with different insecticides; (DDT/ Malathion). As long as DDT offers an epidemiological impact irrespective of the susceptibility status to it, DDT should be the insecticide of choice.

In areas where the vector shows high resistance to DDT and the area does not show any epidemiological response despite effective and adequate coverage, a change may be necessary to malathion provided the vector shows susceptibility to malathion. Third generation insecticides is synthetic pyrethriods (see MAP).

2. ESTIMATION OF THE REQUIREMENT OF INSECTICIDE

This is based on selection of village/area for spray as per criteria by the expert committee on malaria-1995.

It should be borne in mind that no area once projected for spray should be left out of spray because of the reduction in the incidence till further instructions from the Director NMEP who will put up relevant technical data to the Technical Advisory Committee of NMEP appointed by the Govt. of India and obtain their concurrence.

For further details on chemical insecticides for indoor residual spray (I.R.S.) please refer to the table given in MAP B.H.C. has been banned w.e.f. 1997.

When the full supply of insecticide is not made available due to various reasons, the order of priority for spray should be worked out on epidemiological grounds. Special priority should be given to *P. falciparum* areas, projects and specially respective and vulnerable areas

3. Spray Schedule

Spray schedule should be worked out on the basis of transmission season and also on epidemiological situation. Timing of spray should be such that maximum protection is ensured against the transmission. In the event of shortage, the no. of rounds and timings of spray operation may have to be modified in consultation with higher authorities.

4. Focal Spray in special situation as decided by the experts

Focal spray is given once only in 50 houses in and around the positive case house during the transmission season irrespective of species of parasite.

5. Spray Staff

For conducting spray operations, seasonal spray staff consisting of 52 squads i.e. 260 Field Workers and 52 Superior Field Workers, (each squad with five Field Workers and one Superior Field worker) are provided for covering one million population for two rounds of sprays (such as DDT/Synthetic Pyrethroid). For Malathion corresponding increase in spray squad is made according to days by which spray round is to be completed.

6. Spray Pumps

For every five field workers two stirrup pumps or for every three field workers two hand compression sprayers are provided. Each stirrup pump can cover 40 houses per day in plains and a little over half the number in difficult terrain. Hand compression sprayer can cover 30 houses in densely populated plain areas.

The nozzle tip discharge rate should be 740-850 ml. oz per minute. It takes about 5 minutes to spray a house with average sprayable surface area of 150 sq. m. If the nozzle tip discharge rate exceeds 850 ml./minute, it should be replaced. The nozzle should be of flat fan type and spray lance should be kept at a distance of 45 cm from surface. Indian standard nozzle tip should give 50 cm. swath on the wall when the lance is kept at 45 cm. away from the sparyable surface. The spray strips on the wall should overlap about 10 cm. so that the margins of swaths which contain less quantity of insecticides are compensated by overlapping of spray.

7. Supervision of spray operation

Since spray operation is a seasonal activity, it requires a close supervision throughout the period of operation in the entire population. The District Malaria Officer, Assistant Malaria Officer and Malaria Inspectors are responsible for advance planning of spray operation, geographical reconnaissance, enumeration of villages/hamlets, population, houses, rooms, area maps, etc. demarcation of area, distribution of insecticide, procurement of equipment and its maintenance, deputation of Inspectors to the periphery well before the commencement of spray. Later on during the spray operations intensive supervision is to be provided by

these personnel throughout the period. However, at the time of spray the surveillance staff (presently MPWs) of the sub-centre are also involved in the supervisory activity.

In concurrent supervision, the senior supervisors should look into the following aspects.

(i) Whether adequate advance notification has been given to the villagers for spray

(ii) Replacement of turned out spray staff.

(iii) Condition of spray pumps.

(iv) Nozzle tip discharge to be checked.

(v) Preparation of suspension with correct measures and methods.

(vi) Technique of spraying, speed of lance movement and covering of all resting places of the mosquitoes.

(vii) Proportion of refused and locked houses.

(viii) Mopping up of refused houses with proper health education.

(ix) Frequency of checking lower tier supervisory staff.

(x) Proper maintenance of records by SFW.

(xi) Consumption of insectide as against area covered and spray pumps working.

In consecutive supervision the following aspects are to be covered :

(i) Evidence of spray of all the structures.

(ii) Uniformity of spray dispersal.

(iii) Evidence of recent spray.

(iv) No. of rooms completely/partially sprayed.

(v) Percentage of houses refused spray/locked.

(vi) Factors responsible for such refusal.

(vii) Factors responsible for high refusal rate.

(viii) Mopping up with special squad with high refusal areas.

(ix) Evidence of mud-plastering.

(x) Correlation of data between actual coverage and the one presented by the spray staff.

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LIST OF AREAS HAVING *P.F.* RESISTANCE TO CHLOROQUINE, WHERE SECOND LINE OF TREATMENT SULFA+PYRIMETHAMINE COMBINATION IS RECOMMENDED

	State/UTs	Districts
1.	Assam	Karbi-Anglong Nowgong
2.	Arunachal Pradesh	Lohit Triap (Jairampur PHC)
3.	Andaman & Nicobar	G. Nicobar L. Andaman
4.	DNK Project	Covering areas of Madhya Pradesh and Orissa
5.	Meghalaya	All Districts except Jaintia Hills
6.	Maharashtra	Chandrapur Raigarh (Washi PHC)
7.	Nagaland	All districts
8.	Orissa	Keonjhar
9.	Uttar Pradesh	Mirzapur
10.	Mizoram	Aizwal (Sairang PHC) Lunglei (Hnahthial PHC)
11.	Gujarat	Panchmahal (Kadana PHC)
12.	Karnataka	Kolar (Gulur PHC)
13.	West Bengal	Purulia (Ajodhya Hills) (Bogmundi) Jalpaiguri (Uttarlatabari PHC) (Kalchini)

GUIDELINES FOR STERILISATION OF PRICKING NEEDLES AND PRECAUTIONS TO BE ADOPTED BY MPWs, LABORATORY TECHNICIANS AND OTHER HEALTH PERSONNEL WORKING FOR NATIONAL MALARIA CONTROL PROGRAMME

1. Blood smear should always be taken by a Hagedorn needle or by a straight surgical needle and never by hypodermic needle.

2. Needles should be properly sterilised by any of the following methods:

   (a) Inflame the tip of the pricking needle (about 2-3 m.m.) red hot, cool it and prick the cleaned finger for blood smear collection immediately. Every worker must be provided with a spirit lamp.

   (b) Boiling of needles must be done for at least 30 minutes at the sub-centre/ PHC. Every worker going for house visits should carry sufficient number of sterilised needles required for a week and one sterilised needle must be used for one patient. During field visit the worker should keep the sterilised needles in one sterilised specimen tube, properly labelled and another specimen tube for the used needles.

3. Soon after taking the blood smear, the needles must be wiped off of blood with cotton swabs soaked in one of the chemicals like 70% ethanol, Savlon (propanol) or polyvidone iodine (2.5%).

4. One cotton swab soaked in 70% ethanol/Savlon should be used for cleaning the finger of patient before and after pricking.

5. The worker should collect used cotton swabs in a specimen tube and the same should be burnt after the day's work. Care should be taken to sterilise the container.

6. Use one microslide for one patient.

7. MPWs, Laboratory technicians and other workers should take adequate precautions to avoid contact with patient's blood, if they have a cut or wound or a bruise on their fingers.

8. Used blood slides should be cleaned after boiling them in soap-water solution for at least 30 minutes.

9. A chapter on these precautions should be on the regular training curriculum of all para-medicals especially MPWs, Laboratory technicians and health supervisors and should include practical demonstrations also.

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CONTROL DOCUMENT

AND OTHER HEALTH PERSONNEL WORKING FOR NATIONAL MALARIA PREVENTION PROGRAMME

GUIDELINES FOR SUPERVISION OF WORKING AREAS AND

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